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(56) Documents Cited
GB 2271040 A   EP 0297616 A1   WO 82/01288 A1
US 5196842 A   US 5020093 A

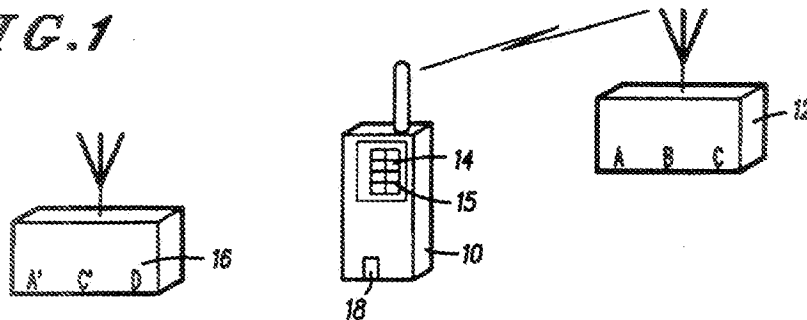(58) Field of Search
UK CL (Edition M) H4K KY2R10P KY4D14I KY4D14R
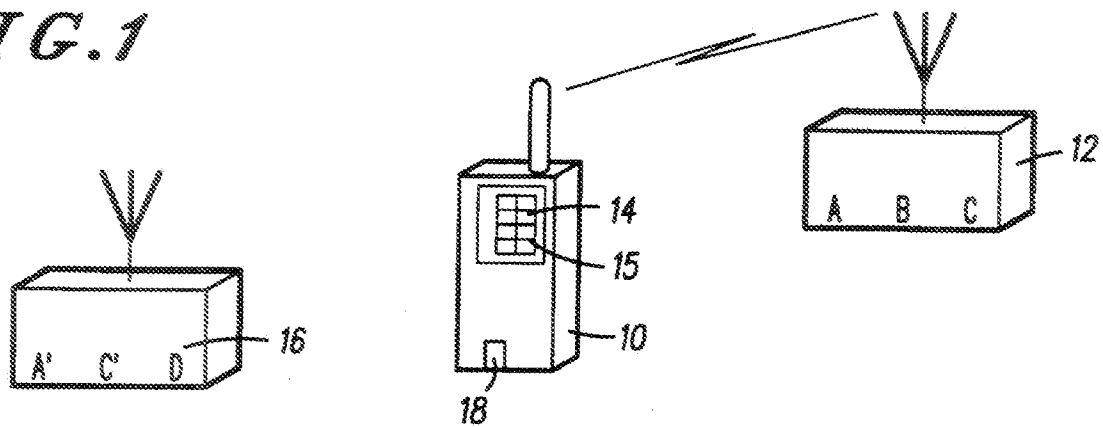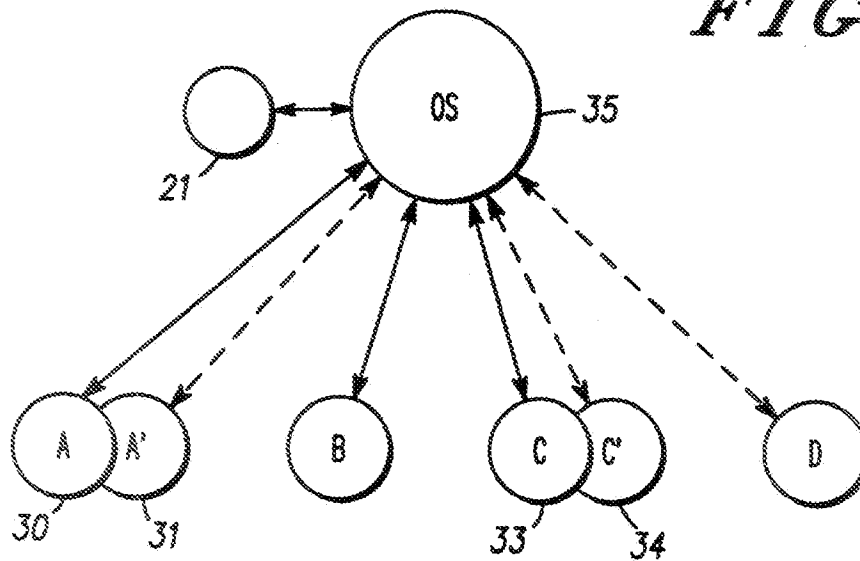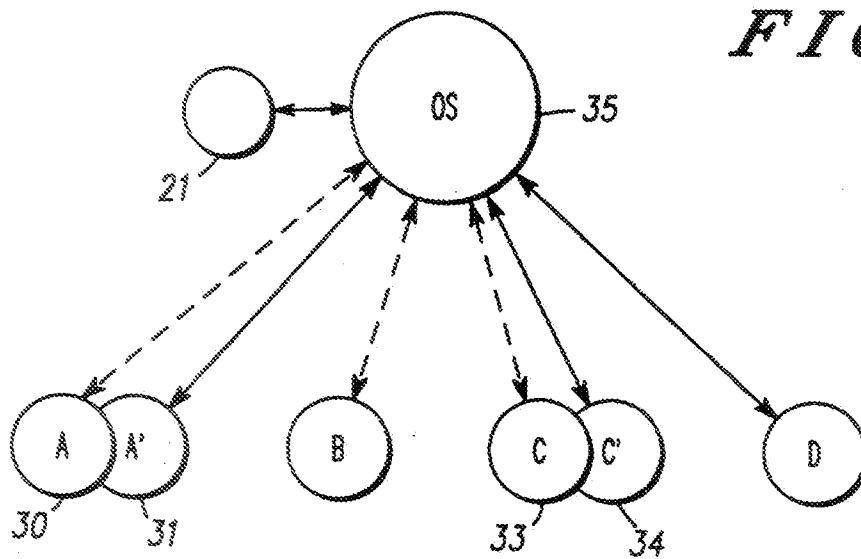KY4M KY4M12 KY4M14 , H4L LDLX LDPX
LDSD LDSX
INT CL⁵ H04Q 7/02 7/04

(54) Mobile station operable on a plurality of communications systems

(57) The mobile station 10 is loaded with software modules to implement service specific and feature specific software for each of a plurality of service networks 12, 16 (eg. cellular telephone networks), and the appropriate software modules are activated in response to an identification module 18 which identifies which network the mobile is to operate on. The identification module 18 may be removable from the mobile 10.

FIG.1

FIG.1

FIG.2

FIG.3

LOAD SERVICE SPECIFIC AND FEATURE SPECIFIC SOFTWARE MODULES INTO MS — 20

LOAD IDENTIFICATION MODULE(IM) — 22

DETERMINE PARTICULAR SERVICE IDENTIFIED BY IM — 24

DETERMINE PARTICULAR SERVICE FEATURES IDENTIFIED BY IM — 26

EXECUTE RESPECTIVE PARTICULAR SERVICE AND FEATURE SPECIFIC SOFTWARE — 28
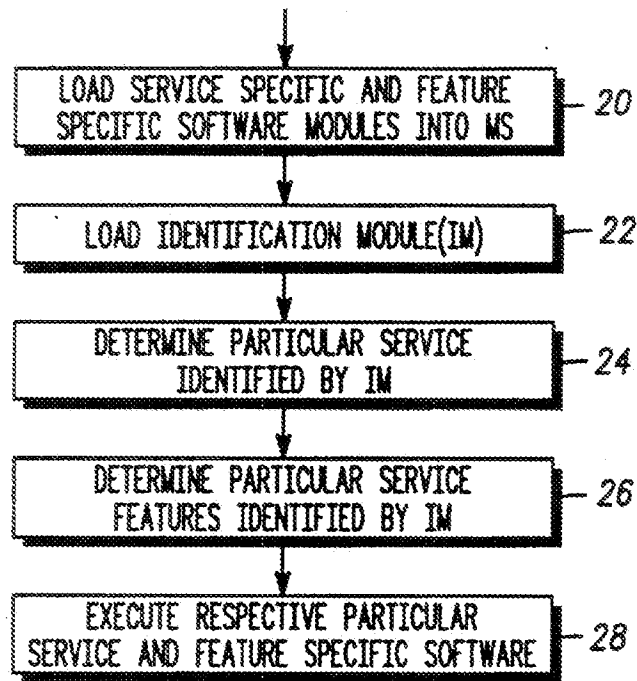
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FIG.4

COMMUNICATIONS SYSTEM

5 ## Field of the Invention

This invention relates in general to an apparatus and method for operating one mobile station in at least two communications systems, and more particularly to operating particular features of different systems on one mobile station.

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Background to the Invention

Present communications systems, such as the pan-European GSM digital cellular radio system, make use of identification modules, such as so-called "smart cards" or "subscriber identity modules" to provide users with
15 access to a communications system through authentication of a subscriber identity stored in the module.

International patent application, publication number WO91/12698 describes a mobile radio operable on a radio communications system and having a removable identification module such as a smart card. A number of
20 call functions are available in the mobile radio and a subset of these are activated according to information stored in the removable identification module.

As mobile communications become more widespread, co-located communications systems exist having certain features in common (e.g. based
25 on the same communications standard).

In digital communications systems there is usually a standard core description of how particular features and services including protocols and interfaces are to be implemented so that there may be a number of different network service providers that may provide the same standard
30 communications system to any number of subscribers. However, in some communications systems supplementary services or features may not be standardised and the implementation of such may be left to the particular service providers. Thus, supplementary features that may be common to many service providers may be implemented differently among the service
35 providers. EP-A-0300721 describes colocated cellular radiotelephone systems.

Typically, a mobile station may be programmed for a particular service provider and therefore, if available, implements features accordingly. In analogue, as opposed to digital communications systems it is more common that the particular service feature is performed at a switch of the

5   service network. If a mobile station changes service providers it must be reprogrammed with the feature implementations according to the new service provider. Thus, there may be one transceiver model that actually has a number of different implementation models available according to different service providers programming requirements.

10   With an increase in the number of different systems in operation, there is an increasing cost of manufacturing equipment to operate on different systems, particularly with the need to program equipment with functions customised to the particular system or systems on which the equipment is to operate.

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Summary of the Invention

According to the present invention, a method for implementing particular features for an identified at least one communication system in the mobile station capable of operating on at least two communications

20   systems including the steps of loading feature specific software for the at least two communications systems into the mobile station, determining from an identification module the identified communication system and the respective features available for the mobile station, and executing the respective feature specific software in the mobile station for the identified

25   communication system.

In an alternative embodiment, an apparatus and a method is provided for a mobile station capable of operating on at least two available service networks and able to implement particular service features for each service network where the mobile station includes an identification module for

30   identifying at least one service network of the available service networks and particular service features for the mobile station, and service network software modules including particular service feature software for each service network for execution by the mobile station.

35   ## Brief Description of the Drawing

FIG. 1 shows a block diagram of a mobile station according to the present invention.

FIG. 2 is a diagram of software configuration according to an embodiment of the present invention.

FIG. 3 is a diagram of software configuration according to an embodiment of the present invention.

5   FIG. 4 is a flow chart for a method according to an embodiment of the present invention.

Detailed Description of the Preferred Embodiment

Referring to FIG. 1, there is shown a block diagram of a mobile station

10   10 that is capable of operating on at least two service networks illustrated by stations 12 and 16. The mobile station 10 includes an identification module 18 and software modules 14 for implementing particular service feature software for each service network of stations 12 and 16. The identification module 18 may be removable and at least identifies one of the service

15   networks 12, 16 of the available service networks 12, 16 as well as possibly particular service features for the mobile station 10.

In practice, the two service networks 12, 16 have fundamental differences in the way that they implement certain supplementary features in a communications system. In response, the mobile station 10 has to

20   configure its service and feature specific software for use on the service that is identified for use. The identification module identifies the service network and the features so that the mobile station then configures its software accordingly. However the software for each possible available service network must be available in the mobile station. Therefore, in the present

25   example, both implementations of the particular service features for each available service network 12, 16 must be resident in the mobile station 10.

As an example, network 12 may be a GSM or a GSM derivative cellular telephone network having service features A, B and C while network 16 is a GSM cellular telephone network having service features A, C and D.

30   Services A, B and C may be, for example a voice mail, an alphanumeric mail and a home-site operation respectively, while service D is some other service, such as dual-line hold and transfer or half-rate coding or indeed a non-standard service such as proprietary voice coding.

In this example, it will be assumed that voice mail (service feature A)

35   and home-site operation (service feature C) have different implementations in the different systems. In the case of the second system, these implementations will be referred to as A' and C'. (There may be a third

system with implementations A" and C"). Software modules of microprocessor program code are stored in memory 15 in the mobile station 10 corresponding to the different implementations. Thus, modules 30 and 31 implement services A and A' while software modules 33 and 34 implement

5   services C and C'. This is illustrated in FIGS. 2 and 3.

FIG. 2 shows a software module representation for a mobile station configuration according to the present invention where the identification module 18 has identified to mobile station 10 that it is to be configured for communication to network station 12. The identification module 18 also

10   identifies to the operating system 35 of mobile station 10 in module 21 (FIG. 4) that features A, B, and C are to be implemented accordingly. Thus, respective implementations or respective network software modules A, B, and C are activated and the rest are deactivated.

Similarly, FIG. 3 shows that when identification module 18 identifies

15   network 16 and features A, C and D, respective modules A', C' and D are activated while the rest are deactivated.

FIG. 4 shows a flow chart for a method according to an embodiment of the present invention. The identification module 18 via software module 21 informs the operating system 35 of the mobile station 10 how to configure its

20   software modules accordingly. This may be implemented by activating particular software branches.

Service specific and feature specific software is loaded into the mobile station 10 for the at least two available service networks 12, 16 as in step 20. The feature specific software may include voice mail implementation or any

25   other supplementary feature provided by the service network.

The identification module is loaded as in step 22. The identification module may be removable. The particular service network is identified to the mobile station 10 by the identification module 18 as in step 24. The particular service features available to the mobile station are identified as in

30   step 26 or may already be predefined. The mobile station executes the respective particular service and feature specific software for the identified service and respective features as in step 28.

Thus, the identification of the service network and features indicates to the mobile station which software needs to be implemented so that the

35   mobile station works with the identified service network. If an identification module indicates a first service network and features then the first service

network and features software is executed. The identification module may implement the appropriate software modules.

When most of the software is common just the different or deviant software for the particular service network is tagged and implemented by
5   the identification module. All software may be branched software.

The present invention may be extended to cover a mobile radio that may configure itself for a number of different communications systems, or more generally any type of radio standard. Particularly, a mobile station capable of operating on the at least two communications systems and an
10   identification module for identifying at least one communication service of the at least two communications systems for the mobile station and a method for implementing particular features for the identified at least one communication system in the mobile station including the steps of loading feature specific software for the at least two communications systems into
15   the mobile station, determining from the identification module the identified communication system and the respective features available for the mobile station, and executing the respective feature specific software in the mobile station for the identified communication system.

The present invention provides an apparatus and a method so that
20   one mobile station may be provided that operates in two communications systems or on two service networks and is able to implement the feature specific software for the communications systems or service network. The present invention avoids custom specific software and allows one model to work on all available service networks or communications systems.

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Claims

1. In at least two communications systems having at least one mobile station capable of operating on the at least two communications systems and

5   an identification module for identifying at least one communication service of the at least two communications systems for the mobile station, a method for implementing particular features for the identified at least one communication system in the mobile station comprising the steps of:

10   loading feature specific software for the at least two communications systems into the mobile station;

determining from the identification module the identified communication system and the respective features available for the mobile station; and

15   executing the respective feature specific software in the mobile station for the identified communication system.

2. In a communications system having at least one mobile station capable of operating on at least two available service networks and an identification

20   module for identifying at least one service network of the available service networks for the mobile station, a method for implementing particular supplementary features for the identified service network in the mobile station comprising the steps of:

25   loading service specific software for the at least two available service networks including service feature software into the mobile station;

determining from the identification module the identified service network and the respective service features available for the mobile station; and

30   executing service specific software in the mobile station for the particular service and respective service features identified.

3. A mobile station capable of operating on at least two available service networks and able to implement particular service features for each service

35   network, the mobile station comprising:

an identification module for identifying at least one service network of the available service networks and particular service features for the mobile station; and

service network software modules including particular service feature

5 software for each service network for execution by the mobile station.

4. A mobile station capable of operating on at least two available service networks substantially as herein described with reference to FIG. 1 of the drawing.

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5. A method for implementing particular features for an identified communication system in a mobile station substantially herein described with reference to FIG. 2 of the drawing.

| Patents Act 1977 | Ϲ | Application number GB 9415217.0 |

Patents Act 1977

Examiner's report to the Comptroller under Section 17 (he Search report)

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Relevant Technical Fields

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(ii) Int Cl (Ed.5)   H04A 7/02, 7/04

Databases (see below)
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Search Examiner
M J BILLING

Date of completion of Search
10 OCTOBER 1994

Documents considered relevant following a search in respect of Claims :-
1-3

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 2271040 A	(MOTOROLA) eg see Figures 1-4; Abstract, page 16 lines 24-29	1-3 at least
X	EP 0297616 A1	(STANDARD ELEKTRIK LORENZ) whole document	1-3 at least
X	WO 82/01268 A1	(MOTOROLA) eg see Figures 1-5; Abstract, page 9 line 4 - page 11 line 7	1-3 at least
X	US 5196842	(MOTOROLA) eg see Figure 3; Abstract	1-3 at least
X	US 5020093	(MOTOROLA) eg see Figures 1, 2; Abstract	1-3 at least

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Databases:The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).